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⑦① Applicant : **SCOT YOUNG RESEARCH LIMITED**  
Hill Road, Lye  
Stourbridge, West Midlands DY9 8HG (GB)

⑦② Inventor : **Young, Ronald Alexander**  
4 Anderson Street  
London SW3 (GB)

⑦④ Representative : **Jones-Robinson, Stanley**  
30 St Catherine Street  
Gloucester GL1 2BX (GB)

⑤④ Cleaning devices and methods.

⑤⑦ A device or method of the invention provides, or utilises, a sheet 5 of material which when used with a damp backing 4 for wiping of a surface to be cleaned collects dust and grit from that surface in a smear-free fashion. The material of the sheet 5 is non-absorbent, at least over a portion of its thickness providing the wiping surface 5b, and is porous with the property that dampness from the backing 4 permeates the material only so as to provide a vapour state at the surface being wiped. As a result of the vapour state the wiped surface is not damped or wetted in a manner which leaves smears - so far as the surface is concerned the effect is as with a dry wipe whereas so far as the dirt collection is concerned dust and grit adheres to the sheet more in the manner of a wet wipe material.

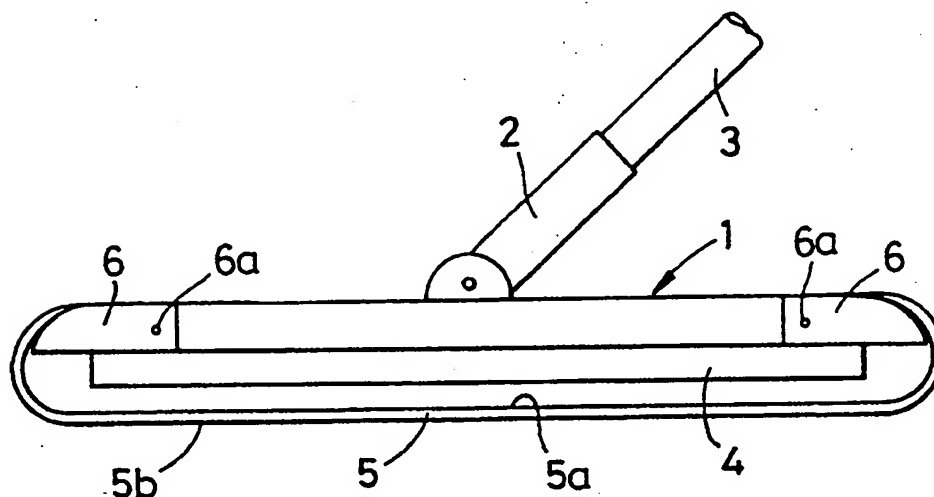


Fig. 1

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The invention relates to cleaning devices and methods of cleaning surfaces, and in particular to devices and methods which provide smear-free cleaning of surfaces.

Paper "wipes" are commonly used to clean surfaces as paper or a similar material can wipe clean a surface without leaving smears. Disposable sweeping systems are also known in which a sheet of material such as paper torn or cut off a roll is attached to a broom-like or similar style holder and is used to collect dust and grit from floors. When dirty the piece of material is detached and thrown away, and replaced by a fresh piece. However, with such a dry wipe procedure the efficiency of dust and grit collection is limited.

It has also been proposed that a sheet of paper-like or textile material should be used attached over a damp or wet backing, the perviousness of the material being such that a controlled flow of liquid passes through the material to the surface being wiped. Such arrangements have been employed either as an applicator to apply a film of liquid, for example liquid polish, to the surface or as a damp or wet wipe dirt collection system. Whilst the efficiency of dirt collection is increased as compared with a dry wipe system, wetting and smearing of the surface being wiped is unavoidable.

The invention has for its object to obtain the advantages of smear-free wiping of a surface in a much more efficient manner, particularly so far as cleaning of the surface being wiped or swept is concerned.

According to its various aspects the invention provides, or utilises, a sheet of material which when used with a damp backing for wiping of a surface to be cleaned collects dust and grit from that surface in a smear-free fashion; to which end the material is non-absorbent, at least over a portion of its thickness providing the wiping surface, and is porous with the property that dampness from the backing permeates the material only so as to provide a vapour state at the surface being wiped. As a result of the vapour state the wiped surface is not damped or wetted in a manner which leaves smears - so far as the surface is concerned the effect is as with a dry wipe whereas so far as the dirt collection is concerned dust and grit adheres to the sheet more in the manner of a wet wipe material. The material (hereinafter referred to as "the vapour-wipe material") also has the property of an outer wiping surface which, when the material is in contact with the damp backing, slides freely or glides over the surface being swept or wiped to provide what might be termed "glissability".

The vapour-wipe material is preferably non-absorbent throughout its thickness and it may be of laminated form with an outer side layer chosen bearing in mind the desired glissability and surface cleaning properties, and an inner layer chosen bearing in

mind the requirement for tensile strength. In a preferred embodiment the vapour-wipe material has a tri-laminate formation of textile fabric laminae, with an intermediate layer of meltblown polypropylene fabric sandwiched between and bonded to layers of spun-bond polypropylene fabric.

According to one aspect of the invention a cleaning device comprises a body or holder providing a backing for a disposable sheet of the vapour-wipe material as aforesaid, which backing incorporates moisture absorbent material such that absorbed liquid produces the required degree of dampness at the back of the disposable sheet.

The disposable vapour-wipe sheet of the invention may be attached to the backing particularly when used to sweep or wipe wall and window surfaces, for example, whilst for floor cleaning especially it may in some cases not be so attached but instead freely placed on the floor with the backing body resting on top. Thus movement of the damp backing over the floor area, conveniently by a handle attached thereto, moves the sheet of material beneath it to collect dust and grit from the floor in a smear-free manner.

The backing is conveniently provided by a mop as normally used in a wet mopping procedure, and either a conventional string mop or a so-called "sweep mop" with a mop pad attached to a holder may be used. In either case the mop is fully wrung out as when used for normal wet mopping, so as to be what might be termed "damp dry", before being placed upon the disposable sheet of vapour-wipe material in accordance with the invention.

Thus, according to another aspect of the invention a method of smear-free cleaning of a surface comprises placing a sheet of said vapour-wipe material on the surface and applying to the back of said sheet a damp wet mop, with the weight of the mop and/or applied pressure holding the sheet against the surface, and orbiting or otherwise moving the mop with the sheet over the surface to clean the latter. When cleaning a floor in this manner, if a particularly stained or dirty patch is reached the mop can be lifted off the vapour-wipe sheet and used by itself to clean that patch, thereafter the mop being again placed on the vapour-wipe sheet to continue wiping over the remaining floor area.

Preferably the holder of a cleaning device in accordance with the invention is hand held in use, and it may have a handle mounting to fit either a short handle for smear-free wiping of window surfaces, for example, or a long handle for use in floor sweeping. In either case the backing for the disposable vapour-wipe material sheet is conveniently of elongate shape with end clips, or individual corner securing devices such as "push-in" fixings, by which the disposable sheet is secured in position on the holder. It may be a mop pad holder such as is conventionally used in a wet or damp mopping system, with the mop pad pro-

viding the absorbent backing material retaining the liquid by which the attached sheet is constantly moistened at the back. Thus the same holder could be used for damp or wet mopping, the vapour-wipe sheet being attached for smear-free wiping of a surface. Alternatively a mop pad holder may be used for smear-free wiping with a pad of cotton or cellular sponge, for example, fitted to the holder in place of the mop pad and providing the backing of liquid-absorbent material.

The invention will now be described with reference to the accompanying diagrammatic drawings. In the drawings, which are shown solely by way of example:

Fig. 1 is a longitudinal side view of a cleaning device in accordance with the invention;

Fig. 2 illustrates the preferred laminated form of the disposable sheet of vapour-wipe material of the invention;

Figs. 3 and 4 illustrate alternative cleaning methods in accordance with the invention;

Fig. 5 is a view similar to that of Fig. 1, depicting a preferred dual-purpose cleaning device in accordance with the invention; and

Fig. 6 is a partial perspective view showing one end of the device of Fig. 5.

Fig. 1 of the drawings illustrates a hand-held device with an elongate body 1 which is attached, via a universally-jointed handle mounting 2, to a handle 3 of the desired length. The body 1 supports a cotton or sponge pad-like and liquid-absorbent backing 4 for a sheet 5 of laminated vapour-wipe material. The sheet 5 is disposable and easily replaced when soiled, being wrapped tightly over the backing 4 and retained, at the ends of the body 1, by hinged end clips 6 pivotable about respective hinge axes at 6a and which are spring loaded to the sheet gripping positions illustrated in which they engage and hold down the respective ends of the sheet 5.

The sheet 5 is fitted after the backing 4 material has been dampened with a liquid, in respect of which it then acts as a moist backing by which the adjacent back surface 5a of the sheet 5 is kept damp as the latter is swept or wiped over a surface, such as that of a window or a floor to be cleaned. This the sheet 5 does with a "vapour-wipe" action, the material of the sheet 5 being such that a vapour condition exists at the outer contact surface 5b of the sheet 5 and the floor is not wetted; in other words, it provides a vapour wipe which leaves the surface dry and smear free rather than having a mopping action.

The liquid with which the backing 4 is dampened may be plain water, for example, or it may be a cleaning liquid such as a detergent solution depending on the degree of cleaning action required. However, it will be appreciated that the device is used with the backing 4 in a "damp-dry" condition so that it merely damps the back surface 5a of the sheet 5 so that the required

vapour condition exists at the front or outer surface 5b. It must not be wet enough to "flood" the surface 5a in which case the sheet would become saturated and the outer surface 5b would become wet.

As shown in Fig. 2 the preferred vapour-wipe material sheet 5 is of porous laminated form, being a 3-ply laminate comprising an inner backing layer 7, an outer surface-wiping layer 8 and an intermediate layer 9. The layer 7 is of spunbond polypropylene of 20gm/M<sup>2</sup> weight, the layer 8 also of spunbond polypropylene of 14gm/M<sup>2</sup> weight and the intermediate layer 9 is of meltblown polypropylene of 10gm/M<sup>2</sup> weight. The moisture applied to the surface 5a permeates the porous non-absorbent sheet 5 to an extent which provides a non-wetting vapour condition at the wiping surface 5b. The outer layer 8, providing the wiping or sweeping surface 5b, in use "glides" over the surface being swept or wiped with a minimum of drag, i.e. it provides a high degree of so-called glissability.

Fig. 3 illustrates in perspective view a method of cleaning using a sweep mop 11 and a rectangular sheet 12 of the 3-ply vapour-wipe material placed freely on the floor with the mop 11 resting on top of it. The sweep mop 11 may be of any known type with a holder 13 having a handle 14 and on which a sweep mop pad 15 can be mounted. The pad 15 is wetted and wrung out, as if to be used for wet mopping, before it is placed on the sheet 12. Movement of the mop 11 over the floor takes the sheet 12 with it, to provide the vapour-wipe and smear-free cleaning of the invention. As previously mentioned, the lower surface of the sheet 12 provides a high degree of glissability and the wet mop pad 15 has a degree of grip with respect to the upper surface such that with the weight of the mop 11 holding down the sheet 12 there is no tendency for the mop to slip off leaving the sheet 12 behind.

Fig. 4 similarly illustrates a similar method but now using a string mop resting on a square sheet 22 of the 3-ply vapour-wipe material. The string body 23 of the mop 21 is, as before, wetted and wrung out as if for wet mopping, and movement over the floor by the handle 24 takes the sheet 22 along with it to provide smear-free wiping of the floor surface. Thus, as in the other illustrated arrangements, a symbiotic relationship is achieved between the damp mop and the vapour-wipe sheet.

In the method of either Fig. 3 or Fig. 4, should a particularly dirty patch of floor be reached the mop 11 (or 21) can be lifted off the sheet 12 (or 22) and used in the normal manner for wet mopping of that patch. The mop is then returned to the sheet and smear-free wiping of the remaining area of floor continued.

The dual-purpose device of Figs. 5 and 6 comprises a collapsible mop pad holder 30 usable either without or with the vapour-wipe sheet 31 (shown in ghost outline in Fig. 6) of the invention attached. In the former condition, with the sheet 31 not attached as

depicted in Fig. 5, the device can be used as a sweep mop for damp or wet mopping in the conventional manner and when the floor (for example) has been cleaned the mop pad 32 can be wrung out and the sheet 31 fitted to provide a final vapour wipe of the cleaned surface.

A three-section articulated construction of the collapsible pad holder 30 comprises similar end sections 33, 34 and a central section 35. The central section 35 is attached to a handle 36 of the desired length via a handle mounting 37. Means for attachment of the mop pad 32 comprise end attachment bars such as 38, each defined by a moulded-in rectangular through aperture 39 in the corresponding end section 33 or 34. Each aperture 39 is normally filled by a hinged closure flap 40 which pivots about a lateral axis at the inner end of the respective aperture 39 and which is either spring loaded to, or for example retained by resilient clip means at, the normal closed position illustrated in Fig. 6.

The mop pad 32 has end attachment tails 42 which are respectively wrapped around the end bars 38 of the holder 30. These end tails 42 are provided with Velcro (TM) type "hook and loop" attachment surfaces so that when the overlapping sections of a tail 42 are pressed together they mutually adhere. To allow such attachment the corresponding flap is hinged upwardly, then being returned to the illustrated closed position in which it acts to maintain the overlapping sections of the corresponding end tail 42 in close mutual engagement.

Latch means (not shown) retain the sections 33, 34, 35 in alignment in the erected holder condition as illustrated in Fig. 5. These latch means are released to collapse the holder 30 so that, in known manner, the end sections 33, 34 hang down from the central section 35 with the mop pad 32 also hanging draped in a loop below them. The mop pad can now be wrung out in a conventional wringer mechanism, again in known manner. When the pad 32 has been so wrung out and is in a suitably damp condition the holder 30 is re-erected and the vapour wipe sheet 31 attached as illustrated in Fig. 6.

Separate and independent attachment means are provided for the sheet 31, these consisting of "push-in" securing devices 43. These devices 43 are respectively positioned adjacent the four corners of the holder 30, being provided two in each of the closure flaps 40 as shown in Fig. 6. Each device 43 comprises a flexible resilient membrane 44 which is cross slotted at 45. Thus when the sheet 31 is pushed through the slot 45 the latter tends to close up and firmly grips the sheet 31, although the latter can readily be removed when desired.

The vapour wipe provided by the invention not only provides efficient pick-up of dirt without wetting the floor, thereby providing a smear free result, but it enables a high degree of glissability to be achieved.

The vapour-wipe sheet travels over the floor much quicker than is the case, for example, when using a wet mop alone. At the same time the sheet prevents moisture reaching the floor in a manner which would wet the latter and result in smearing. The floor can be swept in such manner that dust adheres to the sheet without the floor being left damp or marked, and the efficient dust collection is of particular value in the cleaning of school and hospital environments where it is important not to raise dust which might trigger off allergies or transmit infections.

### Claims

1. A cleaning device or method which provides, or utilises, a sheet of "vapour wipe" material which when used with a damp backing for wiping of a surface to be cleaned collects dust and grit from that surface in a smear-free fashion; to which end the material is non-absorbent, at least over a portion of its thickness providing the wiping surface, is porous with the property that dampness from the backing permeates the material only so as to provide a vapour state at the surface being wiped, and has an outer wiping surface which, when the material is in contact with the damp backing, slides freely or glides over the surface being swept or wiped.
2. A cleaning device or method according to claim 1, wherein the vapour-wipe material is non-absorbent throughout its thickness.
3. A cleaning device or method according to claim 1 or claim 2, wherein the vapour wipe material is of laminated form with an outer side layer which provides the desired glissability and surface cleaning properties, and an inner layer which meets the requirement for tensile strength.
4. A cleaning device or method according to claim 3, wherein the vapour-wipe material is a tri-laminate construction of textile fabric laminae, with an intermediate layer of meltblown polypropylene fabric sandwiched between and bonded to layers of spunbond polypropylene fabric.
5. A cleaning device or method according to claim 4, wherein said intermediate sheet layer is of approximately 10 gm/M<sup>2</sup> weight, said inner side layer is of approximately 20 gm/M<sup>2</sup> weight and said outer side layer of approximately 14 gm/M<sup>2</sup> weight.
6. A cleaning device according to any one of the preceding claims, comprising a body or holder providing a backing for a disposable sheet of the

vapour-wipe material, which backing incorporates moisture absorbent material such that absorbed liquid produces the required degree of dampness at the back of the disposable sheet.

7. A cleaning device or method according to claim 6, wherein the backing is provided by a collapsible mop pad holder to which the vapour-wipe sheet is attached.
8. A cleaning device according to claim 6, or a method using such a device, wherein the disposable vapour-wipe sheet is not attached to the backing but is freely placed on the floor with the backing body resting on top of the sheet.
9. A cleaning device or method according to claim 8, wherein the backing is provided by a mop as normally used in a wet mopping procedure, being either a conventional string mop or a sweep mop comprising a mop pad attached to a holder.
10. A method of smear-free cleaning of a surface which comprises placing a sheet of said vapour-wipe material on the surface and applying to the back of said sheet a damp mop, with the weight of the mop and/or applied pressure holding the sheet against the surface, and orbiting or otherwise moving the mop with the sheet over the surface to clean the latter.
11. A cleaning device in accordance with claim 7, wherein the holder has individual corner securing devices, such as "push-in" fixings, by which the sheet is secured in position, the mop pad providing the absorbent backing material retaining the liquid by which the attached sheet is constantly moistened at the back.

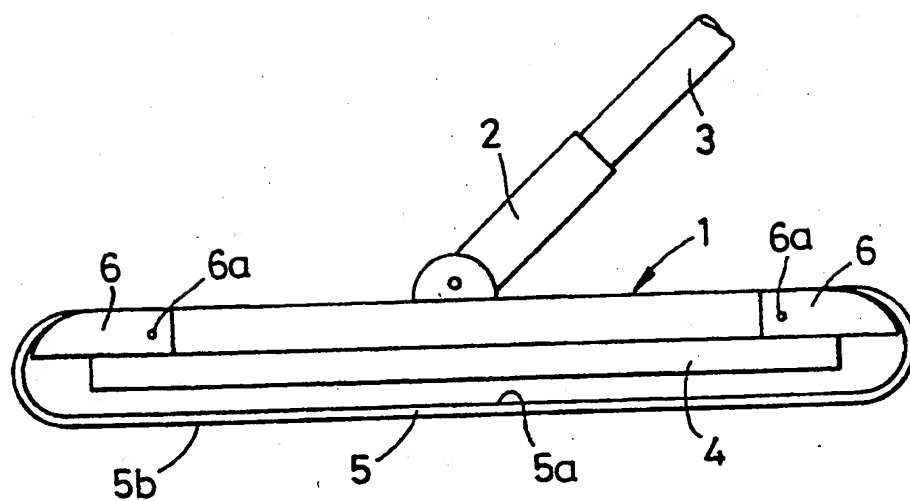


Fig. 1

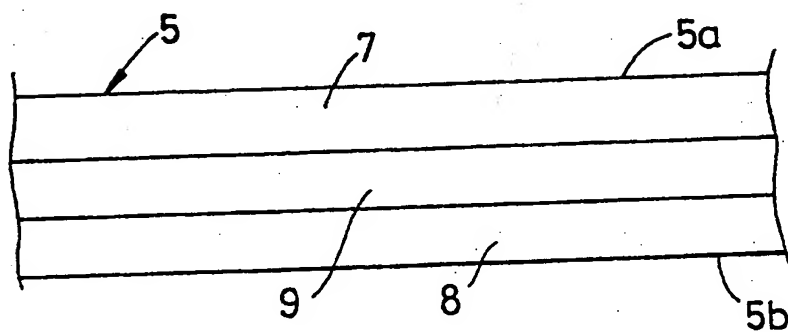


Fig. 2

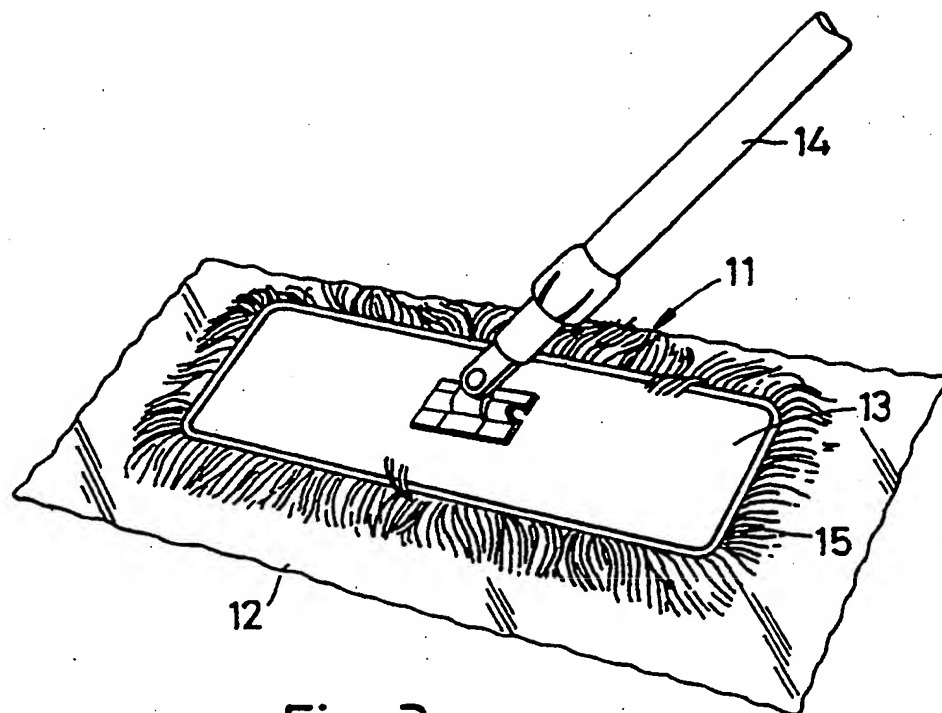


Fig. 3

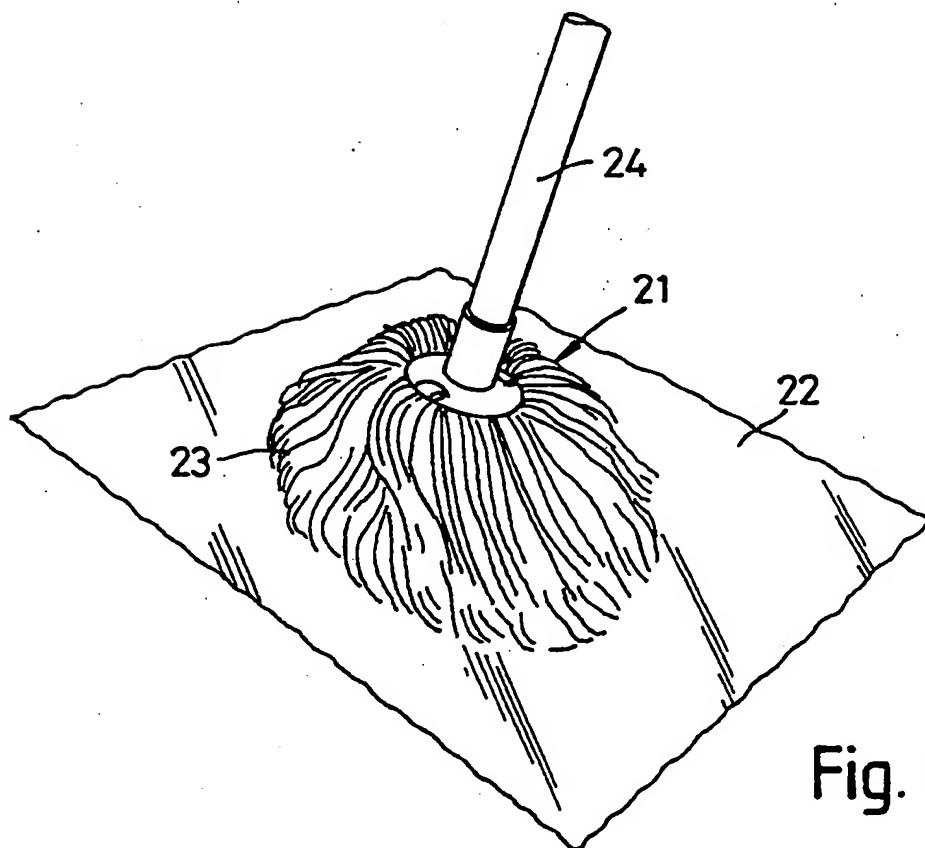


Fig. 4

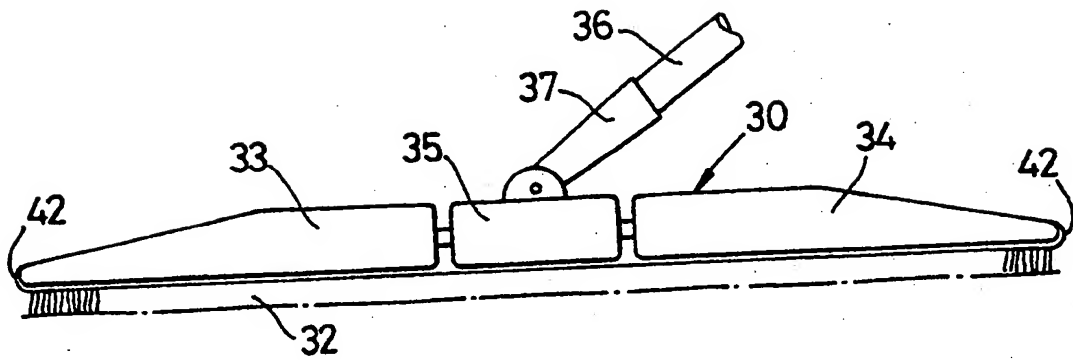


Fig. 5

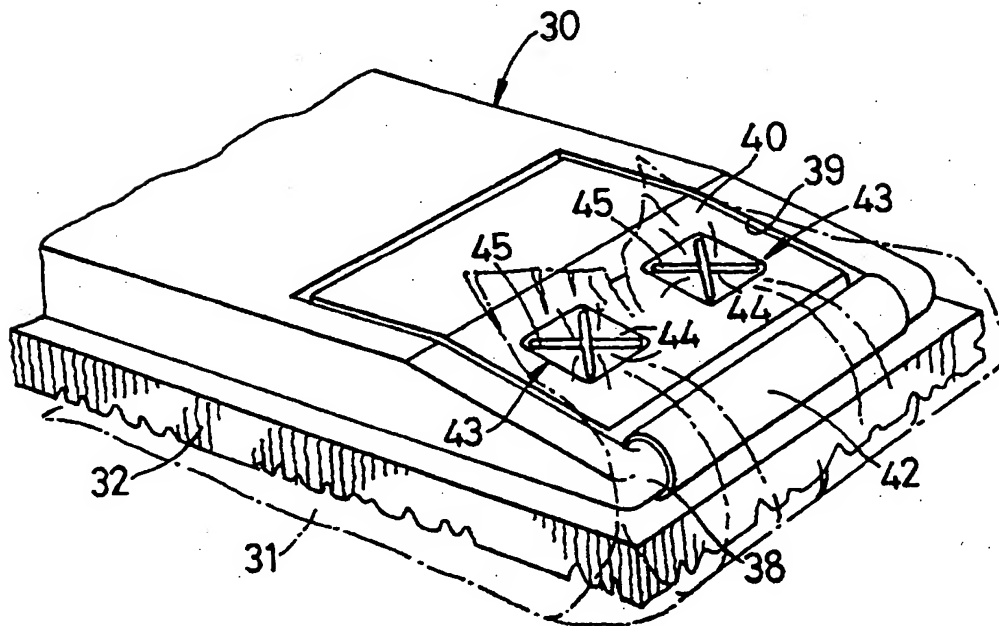


Fig. 6





European Patent  
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# EUROPEAN SEARCH REPORT

Application Number

EP 91304466.5

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 91304466.5
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. CLS)
Y	US - A - 4 636 429 (MORELL et al.) * Totality *	1-4, 6	A 47 L 13/16 A 47 L 13/26
Y	US - A - 4 106 153 (LEMELSON) * Totality *	1-4, 6	
A	EP - A2 - 0 101 306 (UNILEVER NV) * Totality *	1, 5	
A	GB - A - 2 154 129 (UNILEVER PLC) * Totality *	1, 5	
			TECHNICAL FIELDS SEARCHED (Int. CLS)
			A 47 L 13/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 22-08-1991	Examiner BEHMER
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>			

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